CLAIMS

What is claimed is:

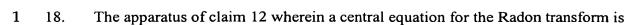
1	1.	A method of designing a set	of wavelet basis, the method	comprising:

- 2 constructing a neural network of arbitrary complexity using a discrete and finite
- 3 Radon transform;
- designing an input wavelet to fit a particular problem;
- feeding an input wavelet prototype designed to fit a particular problem through the
- 6 neural network and its backpropagation to produce an output; and
- 7 modifying an input function of the neural network using the output.
- 1 2. The method of claim 1 wherein constructing the neural network comprises
- 2 backprojecting the Radon transform to a point; and
- 3 subtracting a global average function of the point.
- 1 3. The method of claim 2 wherein the global average function is dependent on the
- 2 transform geometry and may be varied by varying the interconnect structure of the neural
- 3 network.
- 1 4. The method of claim 1 wherein the transform is dual to the network.
- 1 5. The method of claim 4 wherein the transform is weighted to a desired template
- 2 function.
- 1 6. The method of claim 1 wherein modifying the input function comprises subtracting
- 2 a difference between the input and the output from the input wavelet prototype and
- 3 moving the input function in the opposite direction from the difference so that the
- 4 difference converges to zero. 80398.P325

- 1 7. The method of claim 1 wherein a central equation for the Radon transform is
- 2 selected from the group consisting of a Gindikin equation or a Bolker equation.
- 1 8. The method of claim 1 wherein the wavelet bases are used to compress data
- 2 selected from the group consisting of images, multidimensional data, or spatiotemporal
- 3 data.
- 1 9. The method of claim 5 wherein the template function is a sphere.
- 1 10. A system for designing a set of wavelet basis, the system comprising:
- 2 means for constructing a neural network of arbitrary complexity using a discrete
- 3 and finite Radon transform;
- 4 means for designing an input wavelet to fit a particular problem;
- 5 means for feeding an input wavelet prototype designed to fit a particular problem
- 6 though the neural network and its backpropagation to produce an output; and
- 7 means for modifying an input function of the neural net using the output.
- 1 11. A computer readable medium comprising instructions, which when executed on a
- 2 processor, perform a method of designing a set of wavelet basis, the method comprising:
- 3 constructing a neural network of arbitrary complexity using a discrete and finite
- 4 Radon transform;
- 5 designing an input wavelet to fit a particular problem
- 6 feeding an input wavelet prototype designed to fit a particular problem through the
- 7 neural network and its backpropagation to produce an output; and
- 8 modifying an input function of the neural net using the output.
- 1 12. An apparatus for designing a set of wavelet basis, the apparatus comprising:

- a neural network constructor that uses a discrete and finite Radon transform to
 construct a neural network of arbitrary complexity;
- a designing module to design an input wavelet to fit a particular problem, the designing module coupled to the neural network constructor;
- a feeder to feed an input wavelet prototype designed to fit a particular problem through the neural network and its backpropagation to produce an output, the feeder coupled to the designing module; and
- a modifier module to modify an input function of the neural net using the output, the modifier module coupled to the feeder.
- 1 13. The apparatus of claim 12 wherein the neural net constructor is configured to
- 2 backproject the Radon transform to a point and to subtract a global average function of the
- 3 point.
- 1 14. The apparatus of claim 13 wherein the global average function is dependent on the
- 2 transform geometry and may be varied by varying the interconnect structure of the neural
- 3 network.
- 1 15. The apparatus of claim 12 wherein the transform is dual to the network.
- 1 16. The apparatus of claim 15 wherein the transform is weighted to a desired template
- 2 function.
- 1 17. The apparatus of claim 12 wherein the modifier module is configured to subtract
- 2 the difference between the input and the output from the input wavelet prototype and
- 3 move the input function in the opposite direction from the difference such that the
- 4 difference converges to zero.

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- 2 selected from the group consisting of a Gindikin equation or a Bolker equation.
- 1 19. The apparatus of claim 12 wherein the wavelet bases are used to compress data
- 2 selected from the group consisting of images, multidimensional data, or spatiotemporal
- 3 data.
- 1 20. The apparatus of claim 16 wherein the template function is a sphere.

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